APPLICATION FOR UNITED STATES LETTERS PATENT

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TITLE: BROADCAST SERVICE METHOD OF MOBILE COMMUNICATION SYSTEM

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DOCKET NO.: P-0598

BROADCAST SERVICE METHOD OF MOBILE COMMUNICATION SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

[1] The present invention generally relates to transmitting images in a communication system, and more particularly to a system and method for transmitting moving picture (video) information in a mobile communication system.

2. Background of the Related Art

[2] Figure 1 shows an example of how a moving picture (video) performance may be displayed on a plurality of (e.g., two hundred (200)) TFT-LCDs (Thin Film Transistor-Liquid Crystal Display) set up at stadium, athletic field, or other areas having many spectators by using a broadcast service of a mobile communication system. As shown, the content of the moving picture (video) is divided and displayed on four large display screens, each large screen comprised of fifty (50) smaller display screens. Moving picture data is transmitted to the 200 TFT-LCDs (each having a terminal installed therein) when a performance is started, and dynamic pictures are displayed on the four large display screens. At this time, one TFT-LCD is allocated per performer. Namely, each TFT-LCD can display video images of a different person.

[3] Figure 2 illustrates a BMC protocol of a UMTS system for providing a broadcast service such as that of Figure 1 in accordance with the related art. In this protocol, besides a MAC (Medium Access Control) header and an RLC (Radio Link Control) header, a BMC header is also added.

[4] However, in the case of implementing the broadcast service by using the BMC layer, because the BMC protocol includes the BMC header in addition to the MAC header and the RLC header, and since the BMC PDU (Protocol Data Unit) consists of several fields, a user data rate is undesirably degraded. Thus, there has been difficulty in presenting a moving picture (video) performance to spectators in a large area, such as an athletic field by using a base station (Node B) and a terminal due to the above-described problems.

SUMMARY OF THE INVENTION

[5] An object of the invention is to solve at least the above problems and/or disadvantages and to provide at least the advantages described hereinafter.

[6] Another object of the present invention is to improve or maintain a user data rate in a video presentation system.

[7] Another object of the present invention is to provide a broadcast service method and apparatus of a mobile communication system for suitably setting a CRLC channel, a CMAC channel, a CPHY channel and a channel so as to enhance a user data rate when transmitting moving picture (video) data for a moving picture (video) performance by using a BMC layer of a UMTS system.

[8] To achieve at least the above objects there is provided a new broadcast service method of a mobile communication system as follows. A first step in which UTRAN (UMTS Terrestrial Radio Access Network) removes headers added in a BMC SDU (Service Data Unit) and transmits it to a terminal A second step in which the terminal checks the input of a broadcast service key signal by a user, reads an SIB (System Information Block)

transmitted from a base station (Node B) of UTRAN, modular-calculates an IMSI (International Mobile Subscriber Identity) value and selects a corresponding S-CCPCH (Secondary Common Control Physical Channel). Finally, a third step in which an RRC (Radio Resource Control) of the terminal reads a CTCH (Common Traffic Channel) indicator, configures lower layers (CTCH, FACH (Fast Access Channel), and S-CCPCH), and reads all the received data.

BRIEF DESCRIPTION OF THE DRAWINGS

[9] The invention will be described in detail with reference to the following drawings in which like reference numerals refer to like elements wherein:

[10] Figure 1 illustrates an example of presenting a moving picture performance which is displayed on TFT-LCDs by using a broadcast service of a mobile communication system;

[11] Figure 2 illustrates a format of a BMC protocol in a UMTS system;

[12] Figure 3 illustrates a format of a BMC protocol in accordance with the present invention;

[13] Figure 4 is a signal flow chart for defining parameters between the UTRAN and a terminal in accordance with the present invention;

[14] Figure 5 is an explanatory view of a channel configuration in accordance with the present invention;

[15] Figure 6 is a table showing the number of S-CCPCH transmitting CTCH per FA; and

[16] Figure 7 is a flow chart showing a process according to an embodiment of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[17] A preferred embodiment of a broadcast service method of a mobile communication system as shown in Figure 7 includes a first step 710 in which UTRAN (UMTS Terrestrial Radio Access Network) removes headers added in a BMC SDU (Service Data Unit) 701 and transmits it to a terminal 702. A second step 720 in which the terminal checks the input of a broadcast service key signal by a user 703, reads an SIB (System Information Block) transmitted from a base station (Node B) of UTRAN 704, modular-calculates an IMSI (International Mobile Subscriber Identity) value 705 and selects a corresponding S-CCPCH (Secondary Common Control Physical Channel) 706. Lastly, a third step 730 in which an RRC (Radio Resource Control) of the terminal reads a CTCH (Common Traffic Channel) indicator 707, configures lower layers (CTCH, FACH (Fast Access Channel) 708, and S-CCPCH), and reads all the received data 709.

[18] The broadcast service method of a mobile communication system in accordance with one embodiment of the present invention will now be explained with reference to Figures 3, 4, 5 and 6.

[19] Figure 3 illustrates a preferred format of a BMC protocol in accordance with the present invention. Compared to the information shown in Figure 2, it can be seen that many headers have been removed. That is, for the user data received from the upper (higher)

layer of the UTRAN, no header is added at the BMC layer, and the RLC can directly add the RLC header to the user data to constitute the RLC PDU.

[20] In order to do so, several parameters should be defined between the UTRAN and a terminal (UE) as shown in Figure 4. Each terminal (UE) performs an attachment function in the mobile communication network, and a user can enter a keystroke for a broadcast service of the terminal (UE).

[21] The base station (Node B) transmits an N number of S-CCPCH lists per FA (Frequency Allocation) by SIB to the terminal (UE) that is in an idle state. Then, the terminal (UE) reads the SIB, modular-calculates an IMSI value (i.e., calculates an IMSI value using modular arithmetic) and selects a corresponding S-CCPCH. For the SIB, either SIB5 (System Information Block 5) or SIB6 (System Information Block 6) can be used.

[22] Thereafter, the RRC of the terminal (UE) reads a CTCH indicator and configures lower layers (CTCH, FACH (Forward Access Channel) and S-CCPCH).

[23] The UTRAN maps the CTCH, FACH and S-CCPCH and transmits to the terminal (UE). Then, the terminal (UE) reads all received data, and in this case, the terminal reads the received data without using a DRX (Discontinuous Reception) method. Also, an MBMS (Multimedia Broadcast/Multicast service) server and the terminal (UE) should respectively know the type of video codec that the other end is using.

[24] Figure 5 is an explanatory view of a channel configuration in accordance with the present invention, in which it is assumed that broadcast image (video) data employs 64kbps, with 50 groups of content data, 12~13 S-CCPCHs available per FA, and 4 terminals

simultaneously receiving each content data. In this case, the CTCH can be set to operate at 64kbps.

[25] The FACH can also be set to operate at 64kbps. The CTCH and FACH are mapped to each other in a one-to-one manner, and a different logical channel is not mapped to the FACH to which the CTCH is mapped.

[26] Furthermore, the S-CCPCH can also be set to operate at 64 kbps. The FACH and the S-CCPCH are one-to-one mapped, and a PCH (Physical Channel) is not mapped to the S-CCPCH to which the FACH is mapped.

[27] When accommodating 50 groups of data at 64 kbps, in order to present a moving picture (video) performance as shown in Figure 1, fifty 64 kbps S-CCPCHs should be set.

[28] Figure 6 is a table showing the number of S-CCPCHs transmitting CTCH per FA.

[29] A channel select method of the terminal (UE) among 12~13 S-CCPCHs per FA can be expressed by the mathematical formula (1) below:

Index of selected S-CCPCH = IMSI mod K (1)

[30] First, the 192 terminals are divided into four groups, and a PSC (Preliminary Scramble Code) can be set in each terminal in advance, so that one base station is selected per group.

[31] The number of S-CCPCHs that each base station (Node B) may have is as shown in Figure 6, and a channel select method of the terminal (UE) among the 12~13 S-CCPCHs can be expressed by the mathematical formula (1).

[32] In the mathematical formula (1), the IMSI value is adjusted so that a calculation value of IMSI mod K can be the same for four terminals. Thus, since four terminals select the same S-CCPCHs, the same image can be displayed by each of the four terminals.

[33] In addition, if the IMSI value is adjusted so that a calculation value of IMSI mod K can be the same for an N number of terminals, an N number of same images can be displayed by each of the N number of terminals. Accordingly, the number of terminals on which the same images are displayed can be increased regardless of capacity of the mobile communication system capacity.

[34] As so far described, the broadcast service method of a mobile communication system of the present invention has the following advantages. In the BMC protocol of the UMTS system, the headers added to the BMC SDU are removed, and several parameters can be pre-defined between the server and the terminal. Therefore, when moving picture (video) data is transmitted for displaying a moving picture (video) performance, a user data rate can be improved.

[35] In addition, by appropriately adjusting the IMSI value, the number of terminals having the same data contents can be advantageously increased without additionally increasing the number of base stations (node Bs).

[36] The foregoing embodiments and advantages are merely exemplary and are not to be construed as limiting the present invention. The present teachings can be readily applied to other types of apparatuses and methods. The description of the present invention is intended to be illustrative, and not to limit the scope of the claims. Many alternatives, modifications, and variations will be apparent to those skilled in the art.